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ABSTRACT

The spontaneous use of imaging and its relationships to verbal recall and literary analysis were investigated in a study in which 72 college students read a literary text under one of three sets of instructions that manipulated processing depth in an externally valid fashion. Imagery reports and free verbal recalls of the story were collected immediately and two days after reading the story. The results showed that imagery processing, like verbal processing and literary analysis, can be interpreted as having separate dimensions or levels, with superficial levels associated with textually explicit or textually implicit information, and deeper levels associated with more elaborate, reader-constructed responses. The findings support both levels of processing and dual coding in text processing. In addition, they indicate that specific images might symbolize or represent literary themes, that imagery is related to overall affective response to a story, and that a significant relationship exists between imaging a story segment and the story grammar macrostructure of that segment. Evidence of modality specific interferences between imaging and visually scanning print was also investigated. A unique aspect of the study was the development of a reliable methodology for classifying reports of the spontaneous use of imaging. (Author/FL)

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IMAGINATION IN STORY READING: THE ROLE OF
IMAGERY, PROCESSING LEVELS, VERBAL RECALL, AND LITERARY ANALYSIS

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ABSTRACT

The spontaneous use of imaging and its relationships to verbal recall and literary analysis were investigated in an experiment in which college students read a literary text under one of three sets of instructions that manipulated processing depth in an externally valid fashion. Imagery reports and free verbal recalls of the story were collected immediately and two days after reading the story. Results indicated that imagery processing, like verbal processing and literary analysis, can be interpreted as having separate dimensions or levels, with superficial levels associated with textually explicit or textually implicit information, and deeper levels associated with more elaborate, reader-constructed responses. Support is suggested for both levels of processing and dual coding in text processing. Other results indicate that specific images may symbolize or represent literary themes, that imagery is related to overall affective response to a story, and that a significant relationship exists between imaging a story segment and the story grammar macrostructure of that segment. Evidence of modality specific interference between imagery and visually scanning print was also investigated. A unique aspect of the study is the development of a reliable methodology for classifying reports of the spontaneous use of imagery.

**IMAGINATION IN STORY READING: THE ROLE OF IMAGERY,
PROCESSING LEVELS, VERBAL RECALL, AND LITERARY ANALYSIS**

The study of imaginative responses to reading stories may be central to understanding the way we experience or "live through" literature. Imagination in reading involves the power of reproducing images stored in memory under the suggestion of associated language or of recombining former experiences to create new images that vitalize and animate the text. The appreciative, sensuous realization of a literary text through imagination may be the only thing that makes reading literature more than a mechanical act of information processing. Unfortunately, very little research on readers' imagery in literary encounters exists (Lindauer, 1983). Our study was a broad effort to examine the role of imaging in processing a literary text. Our approach was to try to understand the behavior of imagination in reading by connecting the new with the known; that is, to see how imagery behaves in relation to more traditionally researched cognitive performances in the areas of verbal recall, levels of processing, and literary analysis. Borrowing theoretical paradigms from these areas, we attempted to find bridges to understanding spontaneous imaginative processes.

The relationships between the spontaneous use of imagery, verbal recall, and literary analysis have received some recent attention in both theoretical and empirical research (Paivio, 1983b; Sadoski, 1983, 1985); and the notion that text processing can be interpreted from a "levels" perspective has attracted numerous proponents (Adams, 1980; Goetz & Armbruster, 1980; Kintsch, 1979; Lachman & Lachman, 1979; Schwartz 1980). Theoretical speculations regarding the functions of imagery in the comprehension and recall of literary narratives have been offered by others (Ahsen, 1982; Bartlett, 1932; Paivio, 1983b), and some empirical evidence has been established in this area (Giesen & Peeck, 1984; Sadoski 1983, 1985). This evidence suggests that imagery in story processing

can function as a comprehension strategy and as a device for recall and reintegration, and that certain images may be used as symbols for abstractions such as a story's theme. Further interpretation of this evidence suggests that imagery processing, like linguistic processing, may occur in a theoretical hierarchy of levels, with deeper levels associated with more profound aspects of meaning. Paivio (1983a) has likewise suggested that levels approaches in cognition can capitalize theoretically on dual coding, the distinction between verbal and imaginal mental systems (Paivio, 1971). Our study therefore approached imagery from a levels of processing perspective, relating imagery to processing levels in verbal recall and various aspects of literary analysis as well.

The design of the present study involved exploring the spontaneous functioning of imagery, recall, and literary analysis when attempts were made to manipulate processing levels experimentally while still maintaining a substantial degree of generalizability. This study therefore represents a major departure from the bulk of investigations of either imagery or levels of processing. Most research in imagery has involved the learning of word lists, word pairs, or sentences, or the role of imagery in solving spatial problems. Few studies have investigated the role of imagery in text comprehension, and of those studies, most have involved attempts to experimentally manipulate imagery using instructions or brief texts designed to be more or less imageable. In the present study, we investigated readers' spontaneous mental imagery as they read a naturally occurring, reasonably extensive story. In like manner, most investigations of levels of processing have employed relatively low level, artificial verbal materials and contrived tasks such as reading reverse letter order vs. normal reading. In the present study, levels of processing were manipulated by instructions intended to reflect more realistic encounters with reading. A key feature of the present study is this effort to emphasize external

validity through the use of realistic texts and tasks, without sacrificing internal validity considerations such as random assignment and reasonable control of experimental factors.

Several other features of the study should be noted. First, the relationships of imagery, recall, and literary analysis to affect, or overall liking for the story, were explored. Recent research has suggested a relationship between imagery and affect in story reading (Paivio, 1983b; Sadoski, 1984; Sadoski & Goetz, 1985). Second, one of the experimental conditions provided a test for modality specific interference between imaging and visually processing print. Based on the theories of Brooks (1967, 1970) and others, a perceptual visual task should selectively disrupt performance on concurrent visual imagery formation, or vice-versa, providing evidence of a common processing system. Evidence interpretable as modality specific interference in reading literary text has been demonstrated by increased reading times for imagery users over control subjects (Denis, 1982; Giesen & Peeck, 1984), and by increased miscuing in oral reading during story segments most reported as imaged (Sadoski, 1983, 1985). The present study attempts another methodology: the potential interference between reported imagery and the detection of a number of typographical spelling errors placed in the texts of one experimental group. Third, imagery reports and story recall were collected both immediately and 48 hours after reading the story. Previous research (e.g. Kulhavy & Swenson, 1975) has suggested that imagery may be useful in recall of text information over periods of time. Finally, relationships between spontaneous imagery and the story's episode structure as defined by story grammar rules was investigated. Previous research has not explored this relationship.

Method

Subjects

Five intact classes of students in a community college in Texas were used as subjects. The mean age of the students was 20.7 years; 53% were male, 47% female. Students who did not score above the 20th percentile on a standardized diagnostic reading test administered during the study were eliminated from the sample in order to screen out unusual reading difficulties. The final sample size was $N=72$.

Materials

All students read one story, "First Kill", which is an excerpt from a novel for young adults (Annixter & Annixter, 1958). The story, approximately 2100 words (35 paragraphs) in length, has been used in much reading research as one of the stories in the Reading Miscue Inventory (Goodman & Burke, 1972). The story concerns the coming of age of a Sioux Indian youth who determines to become a tribal hunter. Under the mentorship of a tribal elder he forges weapons and decides to join an upcoming buffalo hunt. He is at first mocked by the other hunters, according to Sioux custom, but persists and rides his horse into the stampeding buffalo herd. He selects his prey, but cannot fell it with two arrows. Pursuing the buffalo with determination, he desperately leaps onto its back and kills it by cutting its throat with his hunting knife. He skins his prey and is later accompanied by the other hunters on a triumphal return to camp, where there is ceremony and feasting in honor of his new status. The story has many exciting, imageable passages, and is conventionally plotted with distinct rising action, climax, and falling action. Other literary characteristics such as episode structure (story grammar), character development, and theme are readily identifiable. The readability of the story is in the high

seventh-grade range on the Fry readability graph (Fry, 1977). Since the mean grade-equivalent score on the standardized test given the final sample of students was beyond 12.9, the story could be considered generally easy reading for virtually all of the students. Some description of Sioux customs using Sioux terms may have made one or two passages vague for those with little historical background of this culture. The story was presented double-space typed with no illustrations.

Design and Procedures

Three task conditions not uncommon to schooling were devised in an attempt to experimentally control the level of processing of the story. One task condition instructed students to read the story for its theme, or the authors' underlying message. A brief explanation and example of a theme were provided. A second task condition instructed students to read the story as they would normally read for pleasure. A third task condition instructed students to read the story and circle any typographical errors in the text that they noticed. The text for this group was modified to include only several typos per paragraph (78 total), with five short paragraphs having no typos at all. The typos were also intentionally obvious (e.g. "carevully", "bufaflo") and spelling deviations did not result in other known words. All groups were asked to read the story silently, and not to go back. Students were unaware of the specific tasks to follow reading. Based on the levels of processing interpretations of previous literature, the theme and pleasure instructions were predicted to evoke deeper processing for more text content and meaning. In contrast, the typo instructions were predicted to focus processing on the surface features of the text more of the time yet still allow for some natural engagement with the story. Analysis of the relationships between typo detection and imagery reports could also possibly reveal evidence of modality specific interference between imaging

and visually processing the print during silent reading. Immediately after reading, the groups receiving theme and pleasure instructions were asked to rate how well they liked the story on a 1 ("not at all") to 5 ("very much") scale.

Subsequent to the reading and the affective response scale, students recalled the passage and reported their images of the story. Order of the recall and imagery tasks was counterbalanced. In the recall task, students provided written free recalls of the story and responded to two recall probes. One probe asked them to summarize the plot of the story by briefly telling the major conflict or problem in the story and how it was resolved. The second probe asked them to give the most appropriate theme for the story. A short explanation and example of a literary theme were provided; the explanation and example used in the theme processing instructions were used again here. In the imagery task, students were asked to number and describe in writing each mental image that they remembered from reading the story. Randomization procedures were used to assign students to processing instruction groups and to counterbalance the imagery reporting and recall tasks. All tasks were carried out during regularly scheduled class sessions in regular classrooms.

Forty-eight hours later, during class sessions, students were again asked to provide written free recalls and written and enumerated imagery reports. The counterbalancing order used in the first session's tasks was retained. During this session students first took the reading comprehension subtest of the community college level of the Stanford Diagnostic Reading Test (1977).

Scoring

The scoring of students' recalls and imagery reports entailed an extensive system of qualitative categories that emerged naturally from the data. Recall statements were first categorized as either directly related to a single T-unit of the text, (an independent clause with all its dependent clauses; Hunt, 1965), a synthesis of information from more than one T-unit, an importation that was

consistent with the story, or an importation that was inconsistent with the story. On a random selection of 10% of the cases, proportion of interrater agreement between two independent ratings was .96 for these categorizations. If a recall statement could be directly related to a T-unit, it was further categorized either as capturing the gist of the T-unit with no more than minor distortions or omissions, or as being somewhat related to the T-unit but having major distortions or omissions. Interrater proportion of agreement was .95 on these categorizations. Finally, if a recall statement was categorized as a synthesis of information from more than one T-unit, the various T-units which comprised the synthesis were identified and enumerated. Interrater proportion of agreement here was .89.

Recalls were further scored from the perspective of traditional literary analysis, based on a modification of the subscore system described by Goodman and Burke (1972). These subscores included character recall, simply recalling the names of characters (0-15 points); character development, information about attitudes, motives, or changes in the characters (0-15 points); events, the key occurrences of the episodes of the story as determined by Mandler & Johnson's (1977) story grammar system (0-30 points); plot, the subject's reaction to the plot probe question (0-4, based on a system of holistic scoring); and theme, the subject's reaction to the theme probe question (0-4, based on a system of holistic scoring). Interrater correlations for a randomly selected 10% of the cases for scores on these variables were: character recall $r=1.00$, character development $r=.98$; events $r=1.00$; plot $r=.87$; theme $r=.83$.

Imagery reports tended to be more general than recall reports, and were analyzed in terms of their relationship to paragraph level text units. Images were categorized either as directly related to a text paragraph, a synthesis of information from more than one paragraph, an importation that was consistent

with the story, or an importation that was inconsistent with the story. Interrater proportion of agreement on a random selection of 10% of the cases was .84 for these categorizations. If an imagery report was directly related to a paragraph, it was further categorized as very consistent with the language of the text, elaborated beyond but consistent with the text, or elaborated beyond but contradicting the text. Interrater proportion of agreement was .84 for these categorizations. If an imagery report was categorized as a synthesis of information from more than one paragraph, the various paragraphs represented in the synthesis were identified and enumerated. Interrater proportion of agreement here was .95. Finally, all imagery reports were categorized by sensory modality: visual, auditory, olfactory, gustatory, kinesthetic, tactile (including physical feelings, e.g. discomfort) affective (emotional imagery), nondeterminate, or multiple modality. A conservative standard for categorizing modalities was adopted. For a modality to be assigned, the students' imagery reports had to clearly indicate a modality by use of language such as "I could see. . .," "I could hear. . .," or by inclusion of modality specific information not present in the text. Where no language that revealed modality was present, the reported image was rated as nondeterminate in modality. Interrater proportion of agreement was .84 for these categorizations. Because this categorization system appears to be unique in the literature, Figure 1 exhibits selected relevant examples of imagery reports with associated text segments and categorical ratings.

Figure 1 About Here

These qualitative categories proved quite sound; no recall or imagery data was found that did not fit this system with acceptable reliability. Recalls and imagery reports were tallied in each of their respective categories, and total recall and total imagery were calculated by subject in both the immediate and

delayed data sets. The overall relative frequencies of the various recall and imagery categories is shown in Table 1.

Table 1 About Here

The data from the group instructed to locate typos as they read were scored for misses (words having typos not identified), or false alarms (words incorrectly identified as having typos). Totals in these categories were calculated by subject.

Results

Analyses addressed the following issues: (a) the effect of experimental conditions on recall, imagery, and literary analysis variables, including the characteristics of recall and imagery reporting as related to the story's episode structure (story grammar), (b) relationships between recall, imagery, and literary analysis variables, and (c) relationships between imagery reporting and typographical variables in the group instructed to locate typos as they read.

Effects of Experimental Conditions on Recall, Imagery, and Literary Analysis Variables

Due to some low frequencies, certain conceptually related recall measures were merged for subsequent analysis (see Table 1). Imagery variables that accounted for less than 5% of total reported imagery were then eliminated from analysis; imagery that was of nondeterminate modality was also eliminated from analysis because of difficulty in interpretation.

Three multivariate analyses of variance (MANOVAs) were carried out on the recall, imagery, and literary analysis variables, respectively. The MANOVAs for the recall and imagery variables used 3x2x2 designs with two between-subjects factors (theme, pleasure, or typo processing instructions, and order of recall

and imagery reporting) and one repeated measures factor (immediate vs. 48 hour retention intervals). The MANOVA for the literary analysis variables did not involve repeated measures, as the plot and theme probes were not used in the delayed recall session due to time constraints. Means and standard deviations are given in Table 2.

Table 2 About Here

Significant multivariate main effects were found on recall variables for processing instructions, $F(8,126)=2.02$, $p<.049$, and for retention intervals, $F(4,63)=9.08$, $p<.0001$. No other significant main effects or interactions were found for the recall variables. Univariate $3 \times 2 \times 2$ ANOVAs revealed only a marginally significant effect for processing instructions for the distortion/story inconsistent importations, $F(2,66) = 2.97$, $p<.058$. Fisher's LSD follow-up tests indicated that the group instructed to locate typos had a significantly ($p<.05$) higher mean than the groups receiving theme or pleasure processing instructions. The univariate ANOVAs also revealed significant effects for retention interval on synthesis of information, $F(1,66)=15.45$, $p<.0002$, components of synthesis $F(1,66)=15.45$, $p<.0002$, and gist/story consistent importation, $F(1,66) = 16.83$, $p<.0001$. The mean in the immediate condition was higher than the mean in the delayed condition in all these cases.

While only one recall mean exhibited a univariate statistical difference for processing instructions, a pattern of differences between recall means for processing instructions may help to explain the significant multivariate effect. The mean for the typo processing group was lowest for gist/story-consistent importations, highest for distortion/story-inconsistent importations, and highest for the number of synthesis recalls and on the number of components included in synthesis recalls. This pattern is the same in both the immediate and

delayed conditions. The theme processing group, on the other hand, had the lowest mean synthesis recalls and components included in synthesis recalls in both the immediate and delayed conditions, and had a higher mean than the typo group for gist/story-consistent importations in the immediate condition. Although these differences are not great, the typo group tended to report less gist, more distortion, and synthesized recall into collective statements more than the theme group, with the pleasure group being less distinctively characterized.

No statistically significant main effects or interactions were found on the MANOVA for imagery variables. However, of the seven imagery variables, the typo processing group had the highest mean on only one, story-consistent importations, and lowest means on the remaining six variables.

No statistically significant main effects or interactions were found in the MANOVA for literary analysis variables. Consistent with the pattern for imagery, however, the typo processing group had the lowest mean on four of the five literary analysis variables and the highest on only one, plot, where it was equal to the pleasure processing group.

On the basis of the statistically significant multivariate and univariate differences which differentiated the typo processing group in recall, and the systematic pattern of lowest means on imagery and literary analysis variables, the typo processing group was treated separately in several subsequent analyses, with the theme and pleasure processing groups treated as equivalent.

Recall and Imagery as Related to Story Grammar

Recall. For purposes of relating recall to the story's structure, the text of the story was analyzed according to Mandler and Johnson's (1977) story grammar rules. This resulted in the identification of eight story units including: a setting; 5 complete episodes, each with a beginning, development, and ending;

and two subepisodes, the first of which introduced, and the second of which concluded, a brief subplot. T-units which were seen as macrostructural were identified in keeping with Mandler's (1984, p. 69) contention that story sentences or clauses are hierarchically important to the extent that they express settings, goals, attempts, and outcomes rather than elaborating that content or providing preconditions that must be fulfilled to arrive at the main function of the story grammar unit. Recall of this macrostructure (either as gist or included as a component of a larger synthesis recall) was used as the basis for scoring the literary analysis variable "events" in the study. A 3x2 MANOVA (processing instructions X order of recall and imagery reports) was carried out on the immediate recall of macrostructural T-units for all eight story grammar units. A significant multivariate main effect was found for processing instructions, $F(16,118)=1.98$, $p<.019$. The main effect for order and the interaction were not significant. Univariate 3x2 ANOVAs of the recall of the macrostructural story grammar units indicated a significant difference for processing instructions for the story setting, $F(5,71) = 9.50$, $p<.0002$, and for the second subepisode, $F(5,71) = 3.50$, $p<.036$. Follow-up tests indicated that the pleasure and theme processing groups were significantly ($p<.05$) higher than the typo processing group in recalling the setting, and the pleasure processing group was significantly ($p<.05$) higher than the typo processing group in recalling the second subepisode. The typo group had the lowest mean recall for six of the eight story grammar units, and highest on none.

Imagery. Relating imagery to story grammar units was handled differently. Because of their generality, imagery reports could only be reliably associated with paragraphs rather than T-units, and the story grammar units did not always parse neatly by paragraph. Therefore, frequency counts of imagery reports by story paragraph were computed and correlated with the number of macrostructural T-units found in the respective

paragraph. Because the distribution of imagery reports across paragraphs was similar for all three experimental groups, the entire sample of the study was used for this comparison. An overall partial correlation between the number of reported images per paragraph and number of macrostructural T-units per paragraph, controlling for paragraph length in words, was $r=.45$, $p<.004$.

Previous research with this story (Sadoski & Goetz, 1985) and other stories (Sadoski, 1983, 1985) suggests that imagery reports are not evenly distributed throughout stories but tend to cluster at key climactic points in stories, points which are not specifically defined by story grammar rules (Black & Wilensky, 1979). A similar clustering occurred for all three experimental groups in this study. One paragraph dominated the imagery reports with 71 total reported images, well above the average reported images for a paragraph ($M=20.7$, $SD=16.9$), and well above the next highest paragraph (51 total reported images). This paragraph is identifiably the high point of the story's action and suspense, i.e. its climax: the Indian youth's desperate ride on the buffalo's back when he delivers the death wound. An ANOVA of number of images reported for this paragraph across experimental groups showed no significant differences.

In two previous studies (Sadoski, 1983, 1985), reports of imaging some aspect of the climactic episode in a story was significantly correlated with the subjects' scores for retelling the theme of the story, even when the effect of total reported imagery was partialled out in an effort to control for individual differences in propensity to image. To investigate for this relationship, the subjects' number of images reported for the climactic story-grammar episode was correlated with the subjects' theme scores, with total reported images partialled. The resulting partial correlation for the entire sample was $r=.22$, $p<.035$. Differences in experimental groups indicated that the respective partial correlation for the subjects in the theme processing group was $r=.42$, $p<.04$; for

the pleasure processing group $r=.18$ NS; and for the typo processing group $r=.12$ NS.

Relationship Between Recall, Imagery, and Literary Analysis Variables

Additional correlational analyses were performed between the recall, imagery, and literary analysis variables. For purposes of data reduction and correlational parsimony, the data from the immediate experimental condition were factor analyzed. Separate factor analyses were performed on the data from the group receiving typo instructions, and on the combined data from the groups receiving pleasure or theme instructions, due to the pattern of differences which distinguished the former group. Additional univariate correlational analyses were also performed between the data from the immediate and delayed experimental conditions using the same grouping dichotomy.

The factor analyses were performed on the variables defined on Table 2, with a few changes: The standardized reading comprehension test score was included (pleasure & theme group $M=48.6$, $SD=7.1$; typo group $M=48.4$, $SD=57$) and the affective response rating was included for the applicable groups (pleasure & theme group $M=3.2$, $SD=0.9$). Total reported recall was included as a variable (pleasure & theme group $M=36.9$, $SD=13.5$; typo group $M=28.3$, $SD=14.3$), and total reported imagery was included as a variable (pleasure & theme group $M=7.9$, $SD=5.4$; typo group $M=6.5$, $SD=3.8$). Reported image(s) for the climax episode were also included as a variable (pleasure & theme group $M=2.5$, $SD=2.2$; typo group $M=2.3$, $SD=1.9$). Finally, the components in synthesis recall and the components in synthesis imagery variables were eliminated from the analyses reported here because their loadings were virtually identical to the loadings for synthesis recall and synthesis imagery, respectively. Principal components factor analysis was used, with varimax rotation. The resulting factors and loadings are exhibited in Table 3 for the pleasure and theme group data, and

- Table 4 for the typo group data. Univariate correlations between the data collected in the immediate experimental condition and the 48 hour delayed experimental condition for the combined pleasure and theme groups, and for the typo group, are exhibited in Table 5.

Tables 3,4, & 5 About Here

Relationships Between Imagery and Typographical Variables

Besides serving as an experimental group, the group receiving instructions to locate typos as they read served as a source of evidence for possible modality specific interference between the visual task of locating misspellings, and imaging, particularly in the visual modality. Hypothetically, increased imagery should be associated with lower activity levels on visual perceptual tasks. In order to investigate for such interference, correlations were computed between imagery variables and the number of typo misses and the number of typo false alarms.

Using the subject as the unit of analysis, no significant overall correlations were found between typo misses or false alarms and either total reported imagery or imagery reported specifically in the visual modality. The highest of these correlations was between total imagery reported and false alarms, $r = -.19, NS$. However, imagery in this story was not distributed evenly, and tended to accrue heavily to the most climactic paragraph of the story. Correlations were therefore computed between typo misses and false alarms and imagery reported for the most climactic paragraph alone. This paragraph had 182 words and included eight words with typos. A nonsignificant correlation ($r = .09$) was found between total imagery for the paragraph and typo misses for the paragraph, but a significant negative correlation was found between total imagery for the paragraph and false alarms for the paragraph $r = -.56, p < .002$. No correlations for this paragraph were calculated for imagery in the visual modality due to the

fact that too little of the group's reported imagery for this paragraph was specified sufficiently to determine modality.

Discussion

This study examined, in a realistic context, the experimental effects of levels of processing directions on the imagery, recall, and literary analysis of a short story in an effort to compare the way imaginative responses relate to verbal and literary responses. The design included both immediate and delayed experimental conditions for recall and imagery. Relationships among these variables and conditions were also investigated, as were relationships to story structure and affect. Investigation of modality specific interference between the spontaneous use of imagery and the detection of typographical errors placed in the text for one of the experimental groups was also included.

Experimental effects were usually small but were virtually all in the predicted directions. Statistically significant multivariate main effects on recall were found for processing instructions and for retention interval. Students receiving directions to detect typos while they read exhibited significantly more distortion/story-inconsistent importations in their recall, tended to recall fewer gist/story-consistent importations, and tended to synthesize recall into broad statements more frequently than the other groups, particularly the theme group. While experimental effects on imagery and literary analysis were overall statistically nonsignificant, the typo group systematically exhibited the lowest means on 10 of 12 variables in these categories in the immediate condition. This pattern was not maintained in the delayed condition for imagery. There was an overall tendency for the group assigned to read as they would normally read for pleasure to outperform the other groups—the groups assigned to read for more specific purposes were respectively more constrained.

After a 48 hour delay, significantly less verbal recall in the form of gist/story-consistent importation, or synthesis recalls and their component information, were in evidence for all groups. Imagery, however, appeared to be more robust in memory, exhibiting no significant difference in amount of imagery reported in the immediate and delayed conditions. In fact, more imagery that was consistent with the language of the text was reported by all groups after 48 hours; this was not true of any recall variable. Correlations by subject between immediate and delayed reports were higher for total imagery than for total recall in the groups assigned to read for content (pleasure and theme groups), while the reverse was true in the typo group. There were no significant differences associated with reporting imagery prior to recall or vice-versa, confirming findings of Sadoski (1985) that these recollections behave somewhat independently.

The statistical effects for processing instructions were not especially large in this study, a situation inherent in field experimental situations using realistic tasks and contexts (Kerlinger, 1973). Some insight into these effect sizes can be gained from the analysis of recall of story macrostructure across the consecutive story grammar units. Processing instructions were associated with a large effect on the recall of the setting of the story, a unit comprising only the first paragraph of the story. The group receiving instructions to process typos recalled significantly less of this unit's macrostructure than the other groups. There were no other statistically significant group differences in recall for the remaining story grammar units with the exception of a single subepisode. It would seem that the experimental instructions used in this study had a large effect only as subjects began to read, and were thereafter small or insignificant in effect. Probably, after the subjects instructed to read for typos found only few typos per paragraph and/or became interested in the story, they settled down and began to read in a more nearly normal fashion. However,

their superficial processing produced a multivariate main effect and the mean recall score for the typo group was lowest on six of the eight story grammar units and was highest on none.

While imagery data were not amenable to overall analysis by story grammar units, a significant relationship for the entire sample was found between recall of macrostructural T-units and reported imagery, using the paragraph as unit of analysis and controlling for paragraph length. Possible processing group effects were not considered in this correlation, however, and a more precise investigation of this relationship is perhaps warranted.

As in previous research with the story used in this study (Sadoski & Goetz, 1985) and other stories (Sadoski 1983, 1985), the predominant image reported was an image of the story's climactic event. The theoretical contention that such key imagery may serve as a symbolic conceptual peg for thematic meaning (Paivio, 1983b; Sadoski, 1983, 1985) was also supported. A statistically significant partial correlation between reporting an image of the story's climactic episode and score on the theme variable, controlling for the total images reported, was found. This correlation was considerably higher in the experimental group receiving instructions to read for theme. The magnitude of the latter correlation is consistent with those found by Sadoski (1983, 1985).

The factor analyses suggest differences in the processing of the groups receiving instructions to process for meaningful content (pleasure & theme groups, Table 3) versus the group instructed to locate typos (Table 4). The interpretation of the factor analysis for the combined pleasure and theme groups yields interesting theoretical implications. Factor I receives very high loadings from total recall, recall of episode macrostructure, and recall in the form of gist/story consistent importation (only a small proportion of which was importation, see Table 1). It also receives significant loadings from recall of

character names, recall of character development, and the standardized reading comprehension test. This factor seems to resemble the general verbal reasoning factor that often emerges in factor-analytic studies in reading (Carver, 1973; Rosenshine, 1980; Thorndike, 1973). More specifically, however, this factor seems to deal with text-driven information derived from reading which is relatively "close" to the text rather than information involving additional or alternative processing. Synthesis recall, which involves unitizing selected information from across T-units into recall statements, loads on a separate factor, as does the distortion/story inconsistent importation variable. These variables involve additional or alternative processing other than a relatively direct, accurate rendering of the story. Knowledge of theme and plot, which involves higher-order synthesis and deep semantic processing of story information, loads on a still separate factor. The loading from character development on the same factor as plot and theme may involve the deeper, reader-inferred aspects of characterization rather than explicitly stated traits, motives, etc. Interpreted in this way, these dimensions suggest different levels of processing or levels of meaning in interpreting verbal information.

Factor II receives very high loadings from total imagery, imagery consistent with the language of the text, and climax imagery (roughly half of which was consistent with the language of the text). It also receives significant but lower loadings from imagery which is elaborated in a story-consistent manner, images synthesized from information across paragraphs, and overall affect rating for the story. Where its highest loadings are concerned, Factor II can be interpreted as a general, text-driven imagery factor — the counterpart of Factor I for the imagery coding system. This interpretation lends support to Paivio's (1971, 1983a) dual coding theory of cognition. The significant loading for elaborated images is a minor problem for the close, text-driven aspect of

this interpretation, but elaborated imagery has its highest loading elsewhere. Synthesis imagery also has its highest loading elsewhere, and in fact loads significantly on four separate factors, making this variable complex to interpret theoretically. The significant loading from the affect rating supports theories that affect may be more closely related to the imagery system (Bryden & Ley, 1983; Paivio, 1978; Sadoski, 1984; Sadoski & Goetz, 1985).

Imagery associated with the visual modality, imagery importations, and affective imagery load on different factors, suggesting different levels or dimensions of imagery use. Visual imagery loads highly on Factor IV along with a high loading from imagery elaborated beyond the text, and lower loadings from imagery consistent with the language of the text, synthesis images, and climax imagery. Factor IV may therefore reflect a deeper level of imagery functioning wherein visualized elaborations of text-driven content that is significant to the reader are encoded as images. The significant negative loading from recall of character names suggests a distinction between deeper level imagery tasks and a rather superficial verbal task, consistent with both dual coding and levels of processing theory.

Factor III receives high positive loadings from theme and plot, a somewhat lower loading from character development, and a negative loading from synthesis images. This factor seems to be the "thema" factor found by Sadoski (1983,1985) wherein some arrangement of thematic meaning, story schema, symbolic imagery, or language represents the essence of the story. This interpretation is akin to the notions of mental surrogate structures (Pompi & Lachman, 1967; Yuille & Paivio, 1969), hierarchial, subsumptive macrostructures (cf. van Dijk, 1977), narrative metafunctions (Todorov, 1971) or linguistic theories of literary thematics (Zholkovsky, 1984). In previous studies with fewer variables (Sadoski, 1983,1985), this factor received a significant positive loading from climax imagery, but this loading does not reach significance here. The negative load-

ing from synthesis imagery may suggest that readers who synthesized imagery from information across paragraphs were less likely to have images as thematic symbols and/or were less conscious of overall plot and theme. Alternatively, of course, individual differences in readers reading a story of this length may have resulted in the use of variety of specific images, or no images, for symbolic functions. The remaining factors in the analysis account for succeeding minor proportions of variation, and appear to describe an array of relationships between the verbal and imaginal systems. One factor is dominated by imagery importations, and another is dominated by the verbal recall of distorted information/contradictory importations.

The factor analysis for the typo group (Table 4) is in some ways similar and in some ways dissimilar to the foregoing analysis. Factor I for this group seems to be a general verbal factor, although one imagery variable loads significantly here. Factor II appears to be a general imagery factor which additionally receives a significant loading from the theme variable. These relationships are broadly consistent with foregoing interpretations. The remaining three factors are difficult to interpret theoretically, and the analysis overall perhaps characterizes the disarrayed processing of a group of good readers who were attempting to read a story but regularly had their attention drawn to a surface structure task.

Mixed evidence for modality specific interference between imagery and visual processing was found. No significant overall relationship between typo misses or false alarms and imagery was found, but an overall negative correlation between false alarms and total imagery was in evidence. Looking specifically at the singularly most imaged segment of the story, however, resulted in finding a significant relationship between false alarms and total imagery for the segment, but no relationship between typo misses and imagery for the segment. This evidence may be interpreted several ways. The finding of no signi-

ficant relationship between imagery reported in the visual modality and typographical misses or false alarms speaks against modality specific interference. However, given the conservative classification criteria used here, most images were not reported in language that specified modality. Where this was the case, however, visual imagery was the most common type of imagery specified (Table 1), and it may be reasonable to assume that the total imagery variable largely reflected visual imagery. This would be in keeping with the tendency of most imagery research to recognize visual imagery almost exclusively; this assumption is also supported by the fact that both visual imagery and total imagery load heavily on the same factor for this group (Table 4). If the assumption that most imagery is experienced visually is correct, total imagery may be the more useful correlate here, given its wider variation. Correspondingly, false alarms may be the better variable to indicate increased visual attention to surface structure. The subjects in this study had advanced reading ability and could probably detect misspellings with little effort or effect on deeper processing. False alarms, however, indicate that readers were also attending to words which did not obviously have typos and were therefore devoting more processing attention to surface structure. The significant negative correlation between false alarms and total imagery for the most imaged part of the text might well then support modality specific interference. The finding that significant interference in text processing occurs mainly at heavily imaged points in the text is in keeping with other findings (Sadoski, 1983, 1985). Also, the use of an interesting text and the consequent weakening of the manipulation of processing levels evident in this study might have served to reduce variation on the typo task. These interpretations are based on broad assumptions, however, and more specific investigations of modality specific interference in text processing using this methodology are warranted.

Limitations, conclusions and future research

In many ways, the overall methodology of this study inhibited large effects. Experiments in field contexts using actual literature must forego the tightly controlled precision of laboratory research in a necessary effort to ensure generalizability. The difficulties involving error introduced by individual differences in imagery and quality of imagery reporting are notorious (Marks, 1983; Pressley, 1977). The brief preliminary instructions given to subjects were not strict and apparently exerted only little control on their processing. Nonetheless, the findings of this study can be interpreted with considerable consistency. These findings lend support to theories of levels of processing in text comprehension and recall, and to the dual coding and conceptual peg aspects of Paivio's (1971, 1983a) imagery theories. Further, they suggest that there are levels or dimensions in both verbal and imaginal codes that behaved in a somewhat parallel and complementary way in the processing of this literary text.

Consistent with theoretical predictions of levels of processing research, distinction between levels is fairly clear for verbal recall. Subjects in the experimental group receiving the superficial processing task exhibited somewhat lower quality recall performances and retained significantly and consistently less text content after two days than did subjects in groups asked to process for content. Factor analysis for the latter groups revealed separate factors dominated by verbal recall variables that are interpretable as: recall of textually explicit or implicit information, recall of deeper thematic and structural information, and distorted or contradictory recall. Factors for the superficial processing group were far less clearly interpretable.

The distinction between levels in the imaginal system is not as strong. This may be theoretically intrinsic: the coding of written story text into

mental images may require additional processing depth inherently, thereby narrowing distinctions between such levels or dimensions as may exist in imagery. Experimental group performances systematically but only slightly favored the groups reading for content, and there were no remarkable experimental group differences in imagery reports or subject consistency in amount reported after two days. The pattern of means for the imagery variables in the delayed condition was interesting, however; most of the means on imagery variables for the groups reading for content declined after two days (although the means for textually-specific imagery went up for all groups), but the means for the superficial (typo) processing group increased on most imagery variables. Perhaps spontaneous imagery in this group was initially depressed by the typo-processing task but underwent gestation in memory. At any rate, memory in the form of images appeared more robust than for verbal memory across all groups in this study.

The distinction between levels or dimensions in imagery can perhaps better be seen in the correlational data. For the groups reading for content, separate factors dominated by imagery variables were found that could be interpreted as: imagery that conformed relatively closely to the language of the text, visualization of elaborations on the text, story-consistent imagery importations, and affective or emotional imagery. Factors for the superficial processing group were far less interpretable. Interestingly, while overall liking for this story loads on a factor with total imagery, there appears to be something different about imagery reported in the affective modality. The distinction here may be simple; empathizing with an imagined character or feeling the momentary excitement of described action may be qualitatively and quantitatively different than an overall preferential evaluation.

The literary analysis variables also suggest "levels" distinctions. The superficial processing group again exhibited generally lower performances, especially where close, accurate reading was concerned. However, this group's knowledge of plot and theme, which could only be synthesized from a generalized, global understanding of the text, was more similar to the other groups'. In the factor analysis for the groups reading for content, recall of character names and important specifics of events factored separately from plot and theme scores, further suggesting a depth distinction. Again, such interpretations were far less clear in the factor analysis for the superficial processing group.

Some evidence for the use of key imagery serving a symbolic "peg" function for thematic story meaning was found. A significant relationship between theme score and imagery of the story's climax, the most imaged event in the text, was found for the entire sample, but the magnitude of the relationship was considerably greater in the group instructed to read for the story's theme. While this relationship has been found consistently in short stories (Sadoski, 1983, 1985), future research may investigate if images other than the climax or some cluster or subsidiary symbolic images may be more strongly associated with thematic meaning in longer texts (Paivio, 1983b). An overall significant relationship between imagery of a story paragraph and macrostructural proposition density for that paragraph was also found for the entire sample. This is an interesting theoretical connection that should also be further investigated in future research. Except for these findings and the finding that some factors in the factor analyses receive high loadings from both verbal and imagery variables, little other interaction between verbal and imaginal systems was in evidence in the analyses presented here. This seems consistent with Paivio's (1971, 1983a) theoretical assumption that cognition consists largely of the activity of two partly interconnected but functionally independent and distinct symbolic mental systems.

Possible evidence of modality specific interference between experiencing imagery and visually searching the text for typographical spelling errors was found. The group instructed to detect typos as they read tended to have slightly fewer images that were consistent with, elaborated beyond, or synthesized from the language of the text; their imagery reports indicated more importation. A low negative, statistically nonsignificant correlation was found between total imagery and typo false alarms, but this relationship was much greater and statistically significant in the story paragraph that was reported as imaged more frequently than any other. The lack of a strong overall relationships may not be surprising; the high ability readers in this study may have detected most typos without causing more than a ripple in their semantic or imaginal processing. Nor was the methodology of this aspect of the study as precise as it might have been -- a number of short paragraphs contained no typos and many paragraphs contained only one or two. Perhaps a more indepth investigation using this methodology would reveal clearer trends. However, the finding that modality specific interference is clearly in evidence only at heavily-imaged story points is consistent with other findings (Sadoski, 1983, 1985), and the findings using the methodology of this study are in the same general direction as findings interpretable from other methodologies used with reading literary texts (Denis, 1982; Giesen & Peeck, 1984).

This study borrowed both theory and methodology from research designed primarily to investigate verbal behavior in an effort to examine imaginative behavior in relation. Analysis revealed some predicted, interpretable, and replicative relationships between imagery and more traditional variables, supporting some established theories about reading and cognition. Spontaneous imagination in reading, as used in realistic settings, appears to have a systematic structure which is viable for research in its own right. No subject in

the study expressed any difficulty in complying with our request for imagery reports, and these reports exhibited both qualitative and quantitative distinctions from their verbal recall and literary analysis. We had little difficulty (and some fun) scoring the imagery reports and finding a natural set of categories in the data -- perhaps this system of categories can aid other investigator in the study of imaginative responses in reading. While many methodological and measurement problems still pose great challenges, we feel that further research in this area offers exciting possibilities into a new dimension of reading.

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FIGURE 1

Text segments, protocols, and categorical ratings
of selected imagery reports

TEXT

STUDENT PROTOCOL AND RATING

"Though he had not known for sure that he would be using them soon, Hawk had been making arrows for the past two moons. Not the small, blunt arrows which boys used to shoot at birds and squirrels, but flint-headed arrows, ground sharp as knives."

"I can see Hawk making arrow points." [Consistent with paragraph; visual modality]

"Picture of a boy sitting alone making arrows for his bow dreaming of the day when he can use them." [Elaborated beyond, but consistent with paragraph; visual modality]

"The feathered shaft sank half its length behind the shoulder He let go a second shaft inches below the first. The young buffalo bellowed, yet pounded on"

"Hawk was upset when he shot his first arrow and missed the buffalo's heart." [Elaborated beyond, but consistent with paragraph; affective modality]

"He shot with frustration and excitement." [Elaborated beyond, but consistent with paragraph; affective modality]

"When Hawk shot the buffalo I could imagine the arrow going into the animal." [Consistent with paragraph; nondeterminate modality]

"Scalding shame poured through Hawk. He was not strong enough to bring down game, even with a man-sized bow and perfect arrows! . . . This animal would suffer much, for it would be hours or days before he would die."

"Image of the boy's discouragement on his face after he realizes he doesn't have the strength to shoot an arrow that provides a fatal blow to a buffalo." [Elaborated beyond, but consistent with paragraph; visual modality]

. . . His buffalo mount was crashing now through low brush and Hawk's legs and sides were cut with whipping branches till the blood ran. . . . The animal's blood spurted, covering Hawk's arm."

"I could see the blood on his arm and feel how the buffalo was running wildly. I was running through the brush with him." [Synthesis image that unites information from more than one paragraph; multiple modalities: visual and kinesthetic]

"Hawk in pain after shooting the buffalo. I picture him filled with frustration trying to kill the animal. The scene is bloody and sickening to a boy his age." [Synthesis; affective modality]

"Darkness had almost fallen when Hawk rode into camp. . . . the story of his triumph had gone before him . . . so that there was awe in the eyes of his playmates"

"Hawk riding back into camp and the proudness of his father." [Synthesis image; affective modality]

Standing Elk came and took hold of Hawk's thong bridle, calling out as was the custom.

"Hawk's father's face beaming with pride and approval for his son had done a courageous thing." [Synthesis; visual modality]

"Look, my son has become a hunter! My son is brave!"

"I could see and feel his excitement when he was being honored in the camp." [Synthesis image; multiple modality: visual and affective]

That night there was feasting in the Sioux camp Hawk was asked and re-asked to tell the story of his hunt."

No text with which to relate

"The boy was small, about fourteen, dark skinned, had a feather in his hair and clothing of beads and bearskin. [Story-consistent importation; visual modality]

"I also saw the future of the boy telling his tale to his playmates, then his son, and maybe his grandson." [Story-consistent importation; visual modality]

"Truthfully, scenes from Man From Snowy River come to mind most often. A young boy's determination to prove he's a man." [Story-consistent importation; nondeterminate modality]

NOTE: * * * Indicates that one or more paragraphs were skipped

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TABLE 1

Percentages of total recall and imagery variables in immediate and delayed conditions reported by total sample, N=72

<u>Variable</u>	<u>Immediate</u>	<u>Delayed</u>
Recall		
T-unit gist or minor distortion/omission ^a	65.56	68.11
Major distortion/omission ^b	5.63	5.89
Synthesis of information from two or more T-units	6.88	6.19
Included as a component of a synthesis	15.86	14.01
Story consistent importation ^a	4.00	3.22
Story inconsistent importation ^b	2.07	2.58
Imagery		
Image very consistent with language in paragraph	17.55	23.29
Elaborated beyond but consistent with paragraph	16.47	11.59
Distortion/contadiction of language in paragraph ^c	1.19	1.66
Synthesis of information from two or more paragraphs	14.74	14.73
Included as a component of a synthesis	42.90	42.94
Story consistent importation	7.04	5.57
Story inconsistent importation ^c	0.11	0.22
Imagery Modality		
Visual imagery	22.97	15.45
Auditory imagery ^c	0.11	0.22
Kinesthetic imagery ^c	0.00	0.11
Olfactory imagery ^c	0.54	0.11
Tactile imagery ^c	0.65	0.22
Gustatory imagery ^c	0.00	0.00
Affective imagery	15.60	11.37
Nondeterminate (no modality specified) ^c	57.10	70.64
Multiple (more than one modality specified) ^c	3.03	1.88

a. these variables were merged in subsequent analysis

b. these variables were merged in subsequent analysis

c. eliminated in subsequent analysis

TABLE 2

Means and standard deviations by processing group and by immediate vs. delayed conditions

Variable	GROUP											
	Theme (n=19)				Pleasure (n=26)				Tyto (n=27)			
	Immediate M	Delayed SD	Immediate M	Delayed SD	Immediate M	Delayed SD	Immediate M	Delayed SD	Immediate M	Delayed SD	Immediate M	Delayed SD
Recall												
Glst/story-consistent Importations	31.84	11.08	23.42	10.55	32.31	17.04	24.62	14.22	22.93	15.08	21.30	11.73
Distortion/story-inconsistent Importations	3.37	4.10	2.05	2.55	2.46	1.68	2.08	1.55	3.67	3.04	3.85	3.15
Synthesis recalls	2.11	1.56	1.53	1.22	2.96	1.61	2.00	1.30	3.22	2.41	2.33	1.59
Components in synthesis recalls	5.11	3.51	3.47	3.17	6.81	3.75	4.58	3.14	7.19	5.53	5.22	3.68
Imagery												
Consistent with paragraph	2.11	2.40	3.11	3.89	2.65	3.83	3.50	4.62	1.96	2.53	2.26	3.19
Elaborated beyond paragraph	1.84	2.36	1.16	1.54	2.69	2.45	1.62	2.16	1.74	2.14	1.52	1.95
Synthesis Images	2.00	1.91	1.95	1.51	2.19	1.79	1.62	1.06	1.04	1.63	2.04	1.89
Components in synthesis Images	6.11	5.70	5.26	4.21	6.31	5.32	4.85	3.84	4.30	3.67	6.07	5.99
Story-consistent Importations	0.68	1.25	0.53	1.39	0.92	1.29	0.58	1.06	1.04	1.63	0.96	1.51
Visual Imagery	2.79	2.86	1.37	3.56	3.31	4.15	2.38	3.41	2.70	2.77	1.93	2.64
Affective Imagery	2.58	4.81	1.53	2.86	2.08	3.14	1.15	2.85	1.52	2.79	1.63	2.53
Literary Analysis												
Character recall (names)	5.47	2.01	--	--	6.12	2.27	--	--	4.59	2.47	--	--
Character development	7.89	2.85	--	--	8.12	2.49	--	--	7.07	2.32	--	--
Events (story grammar)	10.26	2.71	--	--	10.48	3.95	--	--	8.49	4.12	--	--
Plot	1.63	0.83	--	--	1.81	0.80	--	--	1.81	0.79	--	--
Theme	2.11	0.94	--	--	1.96	0.72	--	--	1.96	0.85	--	--

TABLE 3

Factor analysis for groups receiving instruction to read for
pleasure or to read for theme, combined $n=45$

Variable	Factor Loadings						
	I	II	III	IV	V	VI	VII
Recall							
Gist/story-consistent importation	.93**	.11	.08	.21	.06	-.16	.01
Distortion/story-inconsistent importation	.11	.02	.06	.04	-.06	-.03	.88**
Synthesis recalls	.03	-.05	-.15	-.20	-.32*	.74**	.26
Total recall	.98**	.06	.06	.11	.01	.01	.04
Imagery							
Consistent with paragraph	.01	.88**	-.02	.29*	-.06	-.12	.10
Elaborated beyond paragraph	.17	.50**	-.03	.66**	.06	.27	.29*
Synthesis images	.09	.37**	-.66**	.30*	-.22	.16	-.33*
Story consistent importations	.13	.01	-.08	.05	.89**	.05	-.13
Visual imagery	.25	.08	-.15	.81**	.14	-.22	-.03
Affective imagery	-.02	.12	.04	.07	.21	.82**	-.25
Image(s) of climax episode	.08	.81**	.12	.33*	.04	.19	-.11
Total imagery	.13	.89**	-.28	.24	.12	.11	.04
Literary analysis							
Character recall (names)	.56**	.02	-.25	-.45**	.41**	.02	.08
Character development	.60**	.21	.53**	.06	.06	.18	-.05
Events (episode macrostructure)	.95**	.05	.09	.05	-.10	.06	.04
Plot	.12	-.10	.76**	.17	-.17	.13	-.09
Theme	.09	-.09	.74**	-.21	-.11	-.19	.05
Standardized reading test	.37**	.02	.11	-.26	-.56**	.20	-.38**
Affective response rating for story	.25	.49**	.20	.13	.30*	-.22	-.28
% of variance	19.8	15.5	11.2	9.9	8.8	8.6	7.3
cum. % of variance		35.5	46.5	56.4	65.2	73.8	81.1

* $p < .05$ ** $p < .01$

Table 4
Factor analysis for group receiving instructions to read for typos, n=27

Variable	Factor Loadings				
	I	II	III	IV	V
Recall					
Gist/story-consistent importation	.94**	.16	.09	-.11	.09
Distortion/story-inconsistent importation	-.02	-.04	.79**	.30	.03
Synthesis recalls	-.01	.07	-.47**	.66**	.29
Total recalls	.94**	.22	-.13	.09	-.01
Imagery					
Consistent with paragraph	.45*	.72**	-.31	-.21	.03
Elaborated beyond paragraph	-.01	.22	.83**	-.15	.01
Synthesis images	.17	.68**	.03	.52**	-.19
Story consistent importations	-.04	-.19	-.12	-.04	.85**
Visual imagery	-.04	.61**	.16	-.14	-.03
Affective imagery	-.07	-.11	.31	.82**	.10
Image(s) of climax episode	.28	.85**	-.11	.12	-.12
Total imagery	.34	.79**	.25	-.06	.33
Literary analysis					
Character recall (names)	.62**	-.08	.25	-.07	.05
Character development	.78**	.18	-.08	.26	.09
Events (story grammar macrostructure)	.92**	.25	-.12	.09	-.02
Plot	.19	.18	.26	.37	.74**
Theme	.02	.39*	.32	.09	-.11
Standardized reading test	.45*	.09	.40*	-.33	-.47**
% of variance	23.8	17.7	12.7	10.7	9.9
cum. % of total variance		41.5	54.2	64.9	74.8

* p<.05
** p<.01

TABLE 5

Correlations between variables in immediate and delayed conditions

	GROUP	
	Pleasure & Theme (n=45)	Typo (n=27)
	<u>r</u>	<u>r</u>
Recall		
Gist/story-consistent importation	.49**	.90**
Distortion/story-inconsistent importation	.60**	.31
Synthesis recall	.52**	.50*
Components in synthesis recalls	.51**	.45*
Total recall	.44**	.91**
Imagery		
Consistent with paragraph	.70	.64*
Elaborated beyond paragraph	.38**	.42*
Synthesis images	.36**	.37*
Components in synthesis images	.26*	.31
Story-consistent importations	.77**	.63**
Visual imagery	.36**	.50*
Affective imagery	.39**	.24
Total imagery	.76**	.72**

*p<.05

**p<.01